



## **Creative Designer**

Performance Task

### **Introduction**

As a new product designer, you need to create a new item that will be the hottest thing for the holiday season! You will need to research and find all the reasons why you think that this product will be successful! Make sure to think about the overall need for this product and what the targeted age group will be. You will need to develop a design and prototype that will be used to promote your new item. Hopefully, this hot new item will be successful and will be the first item that sells out.

### **Big Idea / Essential Questions**

#### **Big Idea**

- Engineering design is a creative process that anyone can do which may result in new inventions and innovations.
- Mathematics is used in the creation of various consumer products.

#### **Essential Questions**

- How does engineering design help create inventions and innovations?
- What role do mathematics and engineering play in product design?

### **G.R.A.S.P.**

#### **Goal**

Your task is to create and design a new product that you think will be very popular for the holiday season. Your challenge is to include the necessary mathematical concepts that would make your product cost-effective while maintaining the overall appeal of the product.

#### **Role**

You are a creative designer. You have been asked to create the hot new item of the holiday season. You will be responsible for using a variety of mathematical concepts in the creation and design of your products.

#### **Audience**

Your audience is the design company team that will be selling your product. You need to create a presentation that will show the team all the details and information about how the new product will be made and sold. You will also need to demonstrate how this product will be cost-productive for the company.

## Situation

As a new product designer, you need to create a new item that will be the hottest thing for the holiday season! You will need to research and find all the reasons why you think that this product will be successful! Make sure to think about the overall need for this product and what the targeted age group will be. You will need to develop a design and prototype that will be used to promote your new item. Hopefully, this hot new item will be successful and will be the first item that sells out.

## Products

### 1. Multimedia Presentation

You will need to create a 1-2 minute multimedia presentation showcasing your product. Remember, you want your new product to be chosen for manufacturing. The design company will want to better understand the mathematical concepts behind the creating of this product. You will need to explain all the reasons why it will be so successful. Make sure to highlight the quality, the durability, and cost-effectiveness of the new item.

- How is your product going to be created?
- Why is this product good for the design company?
- Why should people buy this product?

### Multimedia Presentation - Creative Designer

Achievement Levels	1	2	3	4
<b>Mathematical Thinking</b> (x1)	Product shows very little understanding of multi-digit addition and multiplication related to the costs associated with the making and selling of a product.	Product shows some understanding of multi-digit addition and multiplication related to the costs associated with the making and selling of a product.	Product shows sufficient understanding of multi-digit addition and multiplication related to the costs associated with the making and selling of a product.	Product shows advanced understanding of multi-digit addition and multiplication related to the costs associated with the making and selling of a product.
<b>Content and Mechanics</b> (x1)	The language of the presentation does not engage the audience with the information. The text has many errors in grammar or spelling.	The language of the presentation engages the audience with some information. The text has some errors in grammar or spelling.	The language of the presentation engages the audience with the information. The text has few errors in grammar or spelling.	The language of the presentation thoroughly engages the audience with the information. The text has no errors in grammar or spelling.
<b>Media</b> (x1)	Little of the media used, such as photos, video and sound, tightly connect to the purpose of the product.	Some media used, such as photos, video and sound, tightly connect to the purpose of the product.	Most media used, such as photos, video and sound, tightly connect to the purpose of the product.	All media used, such as photos, video and sound, tightly connect to the purpose of the product.
<b>Presentation</b> (x1)	Audience is not persuaded due to incomplete explanation.	Audience may or may not be persuaded by partial explanation related to the quality, durability and cost effectiveness of the product.	Audience is somewhat persuaded through adequate explanation which emphasizes the quality, durability and cost effectiveness of the product.	Audience is persuaded through thorough explanation which emphasizes the quality, durability and cost effectiveness of the product.
<b>Engineering Design</b> (x1)	Product shows that student(s) thought little about the design problem, what the audience needs, and any limits or restrictions on the design.	Product shows that student(s) somewhat thought about the design problem, what the audience needs, and any limits or restrictions on the design.	Product shows that student(s) thought about the design problem, what the audience needs, and any limits or restrictions on the design.	Product shows that student(s) thoroughly thought about the design problem, what the audience needs, and any limits or restrictions on the design.

### 2 Design Poster

## 2. Design Poster

You need to create a design poster that will explain the details of your hot new product. Make sure to show all the steps involved in creating your product. Describe each step in the process of how and why you created your idea. Don't forget to include the materials that are needed!

- What would people want in a product?
- How is your product going to be created?
- What features will your product have that make it unique?
- What materials will your product be made of?

### Design Poster - Creative Designer

Achievement Levels	1	2	3	4
<b>Poster Elements</b> (x1)	Poster minimally displays the information, details or designs.	Poster displays some information, details and designs.	Poster displays the necessary information, details and designs in a organized manner.	Poster thoroughly displays the necessary information, details and designs in a very organized and appealing manner.
<b>Engineering Process</b> (x1)	Student demonstrates very little understanding that engineering is very important in the design process to help produce a new invention or innovation.	Student demonstrates some understanding that engineering is very important in the design process to help produce a new invention or innovation.	Student demonstrates that engineering is very important in the design process to help produce a new invention or innovation.	Student demonstrates excellent understanding that engineering is very important in the design process to help produce a new invention or innovation.
<b>Design Process</b> (x1)	Poster does not include all of the steps involved in the product design process.	Poster includes some of the steps involved in the product design process. Steps may include an explanation.	Poster includes the steps involved in the product design process. Each step includes an explanation.	Poster includes all of the steps involved in the product design process. Each step includes a detailed explanation.
<b>Layout</b> (x1)	Poster is unorganized and difficult to read.	Poster is somewhat neat and organized. Some of it is hard to read.	Poster is mostly neat and organized. It can be read by the viewer.	Poster is very neat, organized, and easy to read.
<b>Mathematical Elements</b> (x1)	Student demonstrates very little understanding of multi-digit multiplication related to the costs associated with the making and selling of a product.	Student demonstrates some understanding of multi-digit multiplication related to the costs associated with the making and selling of a product.	Student demonstrates basic understanding of multi-digit multiplication related to the costs associated with the making and selling of a product.	Student demonstrates advanced understanding of multi-digit multiplication related to the costs associated with the making and selling of a product.

## 3. Mathematics Journal Article

You are going to write an article for a popular Mathematics magazine. This journal article will be interesting to readers if you include the mathematical skills and concepts that you used to design your new product. Be sure to include all linear and angle measurements, units, perimeter or area, geometric figures, etc. It will be helpful to show the design and picture of your product in the journal article.

- How is math used in the design of your product?
- How do you use measurement in a design process?
- How do you figure out the budget or costs for a design process?

### Mathematics Journal Article - Creative Designer

Achievement Levels	1	2	3	4
<b>Mathematics and Product Development</b> (x1)	The article has very little explanation of the geometric and measurement concepts that are important for creating the new product.	The article somewhat explains the geometric and measurement concepts that are important for creating the new product.	The article explains the important geometric and measurements concepts that are important for creating the new product.	The article thoroughly explains the important geometric and measurement concepts that are important for creating the new product.
<b>Content and Mechanics</b> (x1)	The language of the article does not engage the audience with the information. The text has many errors in grammar or spelling.	The language of the article engages the audience with some of the information. The text has some errors in grammar or spelling.	The language of the article engages the reader with the information. The text has few errors in grammar or spelling.	The language of the article engages the reader with the information. The text has no errors in grammar or spelling.
<b>Geometry</b> (x1)	Few geometric figures are correctly shown and labeled such as classification of shapes, angles, parallel or perpendicular line segments, symmetry, etc.	Some geometric figures are correctly shown and labeled such as classification of shapes, angles, parallel or perpendicular line segments, symmetry, etc.	Most geometric figures are correctly shown and labeled such as classification of shapes, angles, parallel or perpendicular line segments, symmetry, etc.	All geometric figures are correctly shown and labeled such as classification of shapes, angles, parallel or perpendicular line segments, symmetry, etc.
<b>Measurements</b> (x1)	Limited measurements shown are realistic and include appropriate units and labels.	Some measurements shown are realistic and include appropriate units and labels. Minimal work is shown for any calculations such as perimeter or area.	Most measurements shown are realistic and include appropriate units and labels. Some work is shown for any calculations such as perimeter or area.	All measurements shown are realistic and include appropriate units and labels. All work is shown for any calculations such as perimeter or area.

## 4. Prototype

You want this product to be something that is very popular and that will sell very well! You will need to create a prototype of your product (which is a first round model of something). This prototype will help the design company create copies of your product in order to sell it to many people. When you create a prototype, you must use exact measurements that can be copied by the factories where your product will be made by the design company.

(Make sure that you show your work and include all mathematical concepts that you used in the creation of your product.)

- What will your product do or give to people?
- What will your product be made out of?
- What math do you use in the design of your product?
- How will you measure your prototype?

### Prototype - Creative Designer

Achievement Levels	1	2	3	4
<b>Prototype</b> (x1)	The prototype is inaccurate and has few measurements or special features labeled.	The prototype is a somewhat accurate design with some measurements and special features labeled.	The prototype is an accurate design with most measurements and special features labeled.	The prototype is a very accurate and detailed design with all measurements and special features labeled.
<b>Engineering Design</b> (x1)	Product shows that student(s) thought little about the design problem, what the audience needs, and any limits or restrictions on the design.	Product shows that student(s) somewhat thought about the design problem, what the audience needs, and any limits or restrictions on the design.	Product shows that student(s) thought about the design problem, what the audience needs, and any limits or restrictions on the design.	Product shows that student(s) thoroughly thought about the design problem, what the audience needs, and any limits or restrictions on the design.

Achievement Levels	1	2	3	4
<b>Target Audience</b> (x1)	Product shows that little research was done to figure out what item would be best for a specific age group.	Product shows that some research was done to figure out what item would be best for a specific age group.	Product shows that adequate research was done to figure out what item would be best for a specific age group.	Product shows that excellent research was done to figure out what item would be best for a specific age group.
<b>Math Practices in the Design Process</b> (x1)	Product shows little attention to precision and an attempt to use mathematical tools in the design process.	Product shows partial attention to precision and some use of mathematical tools in the design process.	Product shows attention to precision and adequate use of mathematical tools in the design process.	Product shows great attention to precision and excellent use of mathematical tools in the design process.
<b>Measurement</b> (x1)	Few measurements labeled on the product are accurate.	Some measurements labeled on the product are accurate.	Most measurements labeled on the product are accurate.	All measurements labeled on the product are accurate.

## 5. Sales Pitch

You will create a 2 minute sales pitch where you will explain your new product. You will need to include the highlights of the new item and what age or audience you have targeted it for. Make sure you show your audience an example of your product while explaining the math used in the creation process. You can use posters, graphs, visuals or even a Powerpoint to enhance your presentation.

- What are the highlights of your product and why should people buy it?
- What are the features of your design?
- Why will it be popular with specific customers?

### Sales Pitch - Creative Designer

Achievement Levels	1	2	3	4
<b>Target Audience</b> (x1)	Product shows that little research was done to figure out what item would be best for a specific age group.	Product shows that some research was done to figure out what item would be best for a specific age group.	Product shows that adequate research was done to figure out what item would be best for a specific age group.	Product shows that excellent research was done to figure out what item would be best for a specific age group.
<b>Mathematical Concepts</b> (x1)	Product shows very little understanding of multi-digit addition and multiplication related to the costs associated with the making and selling of a product.	Product shows some understanding of multi-digit addition and multiplication related to the costs associated with the making and selling of a product.	Product shows sufficient understanding of multi-digit addition and multiplication related to the costs associated with the making and selling of a product.	Product shows advanced understanding of multi-digit addition and multiplication related to the costs associated with the making and selling of a product.
<b>Engineering Process</b> (x1)	Product shows that student(s) thought little about the design problem, what the audience needs, and any limits or restrictions on the design.	Product shows that student(s) somewhat thought about the design problem, what the audience needs, and any limits or restrictions on the design.	Product shows that student(s) thought about the design problem, what the audience needs, and any limits or restrictions on the design.	Product shows that student(s) thoroughly thought about the design problem, what the audience needs, and any limits or restrictions on the design.
<b>Sales Pitch</b> (x1)	Audience is not persuaded due to incomplete explanation.	Audience may or may not be persuaded by partial explanation related to the quality, durability and cost effectiveness of the product.	Audience is somewhat persuaded through adequate explanation which emphasizes the quality, durability and cost effectiveness of the product.	Audience is persuaded through thorough explanation which emphasizes the quality, durability and cost effectiveness of the product.

## 6. Cost Analysis

You need to create a cost analysis for your new product. Calculate how much you will

need to charge for your product based upon the estimated costs of the materials used to design and build the product. Then you need to create a spreadsheet or graphic organizer that clearly outlines what the costs will be.

- How much do you think will be spent on parts and materials to create the product?
- How much money will the design firm charge people in order to make money?
- What is a profit?
- How will this product make the company a profit?

## Cost Analysis - Creative Designer

Achievement Levels	1	2	3	4
<b>Mathematical Thinking</b> (x1)	Product shows very little understanding of multi-digit addition and multiplication related to the costs associated with the making and selling of a product.	Product shows some understanding of multi-digit addition and multiplication related to the costs associated with the making and selling of a product.	Product shows sufficient understanding of multi-digit addition and multiplication related to the costs associated with the making and selling of a product.	Product shows advanced understanding of multi-digit addition and multiplication related to the costs associated with the making and selling of a product.
<b>Spreadsheet or Graphic Organizer</b> (x1)	Graphic representation is not appropriate based on the type of data collected.	Graphic representation is appropriate based on the type of data collected and contains some required labels/elements.	Graphic representation is appropriate based on the type of data collected and contains most required labels/elements.	Graphic representation is neat, appropriate based on the type of data collected, and contains all required labels/elements.
<b>Product Design</b> (x1)	Product demonstrates that very few mathematical concepts were used to make the product cost-effective while still appealing to the customer.	Product demonstrates that some mathematical concepts were used to make the product cost-effective while still appealing to the customer.	Product demonstrates that mathematical concepts were used to make the product cost-effective while still appealing to the customer.	Product demonstrates that all necessary mathematical concepts were used to make the product cost-effective while still appealing to the customer.
<b>Costs</b> (x1)	Student shows an unorganized list of the costs associated with the creation of the product.	Student shows a somewhat organized list of costs associated with the creation of the product.	Student shows an organized list of all costs associated with the creation of the product.	Student shows a neat, organized list of all costs associated with the creation of the product.

## 7. TV Commercial

You will create a television commercial for your product. Target the age group for which you are designing your product. Highlight the features that make your product special along with the features that will make it a top-selling item this holiday season.

- What makes your product unique or special?
- What design features set it apart from other products and make people want to buy it?
- Who is the product designed for?

## TV Commercial - Creative Designer

Achievement Levels	1	2	3	4
<b>Graphics</b> (x1)	Graphics chosen for commercial are not very original and do not help to capture the attention of the audience.	Graphics chosen for commercial are somewhat original and may interest the audience.	Graphics chosen for commercial are original and eye-catching.	Graphics chosen for commercial are very original and eye-catching.

Performance Levels	1	2	3	4
Commercial contains inaccurate information about the product.	Commercial contains some accurate and/or interesting information about the product.	Commercial contains accurate information about the product.	Commercial contains accurate and interesting information about the product.	
Engineering Design (x1)	Product shows that student(s) thought little about the design problem, what the audience needs, and any limits or restrictions on the design.	Product shows that student(s) somewhat thought about the design problem, what the audience needs, and any limits or restrictions on the design.	Product shows that student(s) thought about the design problem, what the audience needs, and any limits or restrictions on the design.	Product shows that student(s) thoroughly thought about the design problem, what the audience needs, and any limits or restrictions on the design.
Target Audience (x1)	Product shows that little research was done to figure out what item would be best for a specific age group.	Product shows that some research was done to figure out what item would be best for a specific age group.	Product shows that adequate research was done to figure out what item would be best for a specific age group.	Product shows that excellent research was done to figure out what item would be best for a specific age group.